Amendments to Claims

1. (Currently Amended) A method of metal fusion bonding components together, said method comprising the steps of:

providing a flexible articulate tubular device separate from welding apparatus for producing metal fusion for bonding the components, the articulate tubular device having an inlet at one end of the tubular device for receiving a supply of gaseous flux and a terminus at the other end of the tubular device for discharge of gaseous flux;

articulating said flexible articulate tubular device to direct said terminus along a target weld path to be progressively formed between said components; and

supplying a gaseous flux along said flexible articulate tubular device, out said terminus, and toward said target weld path as it is progressively formed.

2. (Original) The method of metal fusion bonding as recited in claim 1, further comprising the step of maintaining the position of said terminus of said flexible articulate tubular device in accordance with the position of a leading edge of a weld bead along said target weld path.

3. (Original) The method of metal fusion bonding as recited in claim 1 further comprising the step of navigating at least one bend within a tubular structure.

4. (Original) The method of metal fusion bonding as recited in claim 1, wherein said step of articulating is conducted in accordance with said target weld path having an irregular path.

5. (Original) The method of metal fusion bonding as recited in claim 1, wherein said step of supplying involves extending a gas feed line through said flexible articulate tubular device.

6. (Original) The method of metal fusion bonding as recited in claim 1, further comprising the step of initially positioning said flexible articulate tubular device in relation to said components.

7. (Original) The method of metal fusion bonding as recited in claim 6, further comprising the steps of:

conveying visual signals from said terminus of said flexible articulate tubular device; and

translating and articulating said flexible articulate tubular device in response to said visual signals.

8. (Original) The method of metal fusion bonding as recited in claim 6, further comprising the step of further positioning said flexible articulate tubular device so as to trace said target weld path.

9. (Original) The method of metal fusion bonding as recited in claim 8, wherein said further positioning step comprises the step of measuring temperature at two or more locations at said terminus of said flexible articulate tubular device.

10. (Original) The method of metal fusion bonding as recited in claim 9, wherein said further positioning step further comprises articulating said flexible articulate tubular device in response to said measuring temperature step.

11. (Original) The method of metal fusion bonding as recited in claim 1, wherein said components comprise at least a pair of tubular components.

12. (Original) The method of metal fusion bonding as recited in claim 11, wherein said articulating step comprises articulating said flexible articulate tubular device within said at least a pair of tubular components.

13. (Currently amended) A method of metal fusion bonding an assembly of components, the assembly having an upper side for engagement by welding apparatus and an underside, the method comprising the steps of:

providing a flexible articulate tubular device separate from welding apparatus for producing metal fusion for bonding the components, the articulate tubular device having an inlet at one end of the tubular device for receiving a supply of gaseous flux and having a terminus at the other end of the tubular device for discharge of gaseous flux;

positioning said flexible articulate tubular device at an underside of said components in correspondence with a target weld path to be progressively formed between said components;

articulating said flexible articulate tubular device to direct said terminus along said target weld path as it is progressively formed; and

supplying a gaseous flux through said flexible articulate tubular device out of said terminus and toward said target weld path.

14. (Currently Amended) The method as recited in claim 13, wherein said components comprise a plurality of tubular structures and the flexible articulate tubular device is positioned and articulated inside a tubular structure to supply gaseous flux to said target weld path.

15. (Original) The method as recited in claim 14, wherein said positioning step comprises:

conveying visual signals from said terminus of said flexible articulate tubular device; and

translating and articulating said flexible articulate tubular device in response to said visual signals.

16. (Original) The method as recited in claim 14, further comprising:

measuring temperature at two or more locations at said terminus of said flexible articulate tubular device; and

articulating said flexible articulate tubular device in response to said measuring temperature step.

17. (Withdrawn) An apparatus for facilitating a welding operation on components having a target weld path, said apparatus comprising:

a flexible articulate tubular device having:

a plurality of pivotable segments stacked in pivotable relation to one another, said plurality of pivotable segments including a terminus segment;

a plurality of control wires for actuating said plurality of pivotable segments, said plurality of control wires extending through at least portions of said plurality of pivotable segments and connecting to said terminus segment; and

a drive device connected to said plurality of control wires for translating said plurality of control wires; and

a shield gas supply line attached to said flexible articulate tubular device for supplying gas to said target weld path.

18. (Withdrawn) The apparatus as recited in claim 17, further comprising a nozzle attached to a portion of said flexible articulate tubular device and in communication with said shield gas supply line.

19. (Withdrawn) The apparatus as recited in claim 17, further comprising:

at least one thermal responsive device attached to said flexible articulate tubular device for measuring heat from said welding operation.

20. (Withdrawn) The apparatus as recited in claim 19, further comprising:

a control module for controlling said flexible articulate tubular device via said drive device, said control module comprising:

a thermal analysis system which receives and processes output from said at least one thermal responsive device; and

a motion controller which receives output from said thermal analysis system, said motion controller including an algorithm for converting said output from said

thermal analysis system into motion control commands and for transmitting said motion control commands to said drive device, whereby said drive device articulates so as to articulate said flexible articulate tubular device and maintain said flexible articulate tubular device in correspondence with said target weld path.

21. (Withdrawn) The apparatus as recited in claim 20 further comprising:

at least one fiber optic device attached to said flexible articulate tubular device for use in initially positioning said flexible articulate tubular device within said tubular component; and

said control module further comprising:

a fiber optic system which receives and processes output from said at least one fiber optic device;

said motion controller receiving output from said fiber optic system, said motion controller including an algorithm for converting said output from said fiber optic system into motion control commands and for transmitting said motion control commands to said drive device, whereby said drive device articulates so as to articulate said flexible articulate tubular device.

22. (Withdrawn) An apparatus for metal fusion bonding of two or more components that include a target weld path for a weld bead having a leading edge, said apparatus comprising:

a gas feed line;

a flexible articulate tubular device in communication with said gas feed line to feed gas through to said target weld path, said flexible articulate tubular device comprising:

a plurality of pivotable segments stacked in pivotable relation to one another, said plurality of pivotable segments including a terminus segment, said terminus segment comprising:

at least one fiber optic device attached thereto for initially positioning said flexible articulate tubular device; and

at least one thermal responsive device attached thereto for measuring heat; and

a plurality of control wires for actuating said plurality of pivotable segments, said plurality of control wires extending through at least portions of said plurality of pivotable segments and connecting to said terminus segment;

a drive device connected to said plurality of control wires for translating said plurality of control wires;

a control module for controlling said flexible articulate tubular device, said control module comprising:

a fiber optic system which receives and processes output from said at least one fiber optic device;

a thermal analysis system which receives and processes output from said at least one thermal responsive device; and

a motion controller which receives output from said thermal analysis system, said motion controller including an algorithm for converting said output from said thermal analysis system into motion control commands and for transmitting said motion control commands to said drive device, whereby said drive device articulates so as to translate said plurality of control wires and thereby articulate said flexible articulate tubular device and maintain said terminus segment in correspondence with said leading edge of said weld bead.